Amendments to the Claims

The listing of claims below will replace all prior versions and listings of claims in the application.

1-20. (Canceled)

21. (Currently Amended) A system ~~for detecting and measuring a phase of a response signal of a biological system,~~ comprising:

an input device configured to receive ~~the response signal;~~ a signal produced by a biological system;

a ~~processor coupled to the input and~~ processing device configured to determine a ~~rate of change with respect to time~~ derivative of an estimated phase ~~signal~~ of the ~~response signal~~ signal, the estimated phase being indicative of a condition of the biological system, and to integrate the ~~rate of change with respect to time of the estimated phase signal, wherein the rate of change with respect to time of the estimated phase signal is a function of the response signal;~~ derivative; and

~~a first~~ an output ~~coupled to the processor and~~ device configured to ~~present~~ display the estimated ~~phase signal in a visual form, wherein the estimated phase signal is indicative of a condition of the biological system.~~ phase.

22. (Currently Amended) The system of claim 21, wherein the ~~processor~~ processing device is further configured to produce an estimated ~~response~~ signal of the biological system as a function of the estimated ~~phase signal.~~ phase.

23. (Currently Amended) The system of claim 21, wherein:

the derivative of the estimated phase is a function of the signal; and

the ~~processor~~ processing device is configured to subtract an estimated ~~response~~ signal of the biological system from the ~~response~~ signal to produce the function of the ~~response~~ signal.

24. (Currently Amended) The system of claim 23, wherein the ~~processor~~ processing device is configured to subtract the estimated phase ~~signal~~ from a difference of the estimated ~~response~~ signal subtracted from the ~~response~~ signal to produce the function of the ~~response~~ signal.

25. (Currently Amended) The system of claim 23, further comprising a second output ~~coupled to the processor and~~ device configured to ~~present~~ output the estimated ~~response~~ signal.

26. (Currently Amended) The system of claim 23, further comprising a Kalman filter ~~coupled to the processor and~~ configured to reduce noise in ~~the~~ a difference of the estimated ~~response~~ signal subtracted from the ~~response~~ signal.

27. (Currently Amended) The system of claim 26, wherein the Kalman filter ~~comprises a function of~~ is configured to produce a difference between a variable that represents ~~the~~ a phase of the ~~response~~ signal and a variable that represents the estimated ~~phase signal.~~ phase.

28. (New) The system of claim 22, wherein the function of the estimated phase comprises a sine function.

29. (New) The system of claim 23, wherein the processing device is configured to multiply a first factor by a difference of the estimated signal subtracted from the signal to produce the function of the signal.

30. (New) The system of claim 29, wherein the first factor is equal to a product of a second factor multiplied by a third factor.

31. (New) The system of claim 30, wherein the second factor is a function of the estimated phase.

32. (New) The system of claim 31, wherein the function of the estimated phase is a cosine function.

33. (New) The system of claim 30, wherein the third factor is a function of a difference between a variable that represents a phase of the signal and a variable that represents the estimated phase.

34. (New) The system of claim 33, wherein the function of the difference between the variable that represents the phase of the signal and the variable that represents the estimated phase is a covariance function.

35. (New) The system of claim 24, wherein the processing device is configured to multiply the estimated phase by a factor to produce the function of the signal.

36. (New) A system, comprising:

means for determining a derivative of an estimated phase of a signal received from a biological system, the estimated phase being indicative of a condition of the biological system, and the derivative of the estimated phase being a function of the signal;

means for integrating the derivative of the estimated phase; and

means for displaying the integrated derivative of the estimated phase.

37. (New) The system of claim 36, wherein the function comprises a difference between an estimated signal of the biological system and the signal.

38. (New) The system of claim 37, wherein the estimated signal is a function of the estimated phase.

39. (New) A tangible computer-readable medium having stored thereon, computer-executable instructions that, if executed by a computing device, cause the computing device to perform a method comprising:

determining a derivative of an estimated phase of a signal received from a biological system, the estimated phase being indicative of a condition of the biological system, and the derivative of the estimated phase being a function of the signal;

integrating the derivative of the estimated phase; and

displaying the integrated derivative of the estimated phase.

40. (New) The tangible computer-readable medium of claim 39, wherein the method performed by the computer-executable instructions stored on the tangible computer-readable medium further comprises:

repeating the determining and the integrating so that the estimated phase reaches a steady state.